

SECTION 710 PAINTING TRAFFIC STRIPES

710-1 Description.

Apply Paint Traffic Stripes and Markings in accordance with the details shown in the Contract Documents, and remove traffic stripes and markings when required.

710-2 Materials.

710-2.1 Paint Materials: Use only paint materials listed on the Qualified Products List (QPL), and meet the requirements of 971-1 and 971-19. The Engineer will take random samples of the paint materials in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

710-2.2 Glass Spheres: Use only glass spheres listed on the Qualified Products List (QPL), and meet the requirements of 971-1 and 971-14. The Engineer will take random samples of the glass spheres in accordance with ASTM D 1155 and the Department's Sampling, Testing and Reporting Guide schedule.

710-3 Equipment.

Use equipment that will produce continuously uniform dimensions of traffic stripes and markings of varying widths and meet the following requirements:

(a) capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of paint and capable of following straight lines and making normal curves in true arcs.

(b) capable of applying glass spheres to the surface of the completed stripe by an automatic sphere dispenser attached to the striping machine such that the glass spheres are dispensed closely behind the installed line. Use a glass spheres dispenser equipped with an automatic cut-off control synchronized with the cut-off of the traffic paint and applies the glass spheres in a manner such that the spheres appear uniform on the entire traffic stripes and markings surface with, 50 to 60% embedment.

(c) capable of spraying the paint to the required thickness and width without thinning of the paint. Equip the paint tank with a mechanical agitator and nozzles equipped with cut-off valves which will apply broken or skip lines automatically. Provide each nozzle with suitable line guides, either metallic shrouds or air blasts.

710-4 Application:

710-4.1 General: Mix the paint thoroughly prior to pouring into the painting machine. Apply paint to the pavement by spray or other means approved by the Engineer. The Engineer will conduct field testing in accordance with FM 5-541. Remove and replace traffic stripes and markings not meeting the requirements of this Section at no additional cost to the Department.

Ensure that existing pavement markings are removed, such that scars or traces of removed markings will not conflict with new stripes and markings by a method approved by the Engineer.

Prior to applying pavement stripes and markings, remove any material that would adversely affect the bond of the pavement stripes and markings by a method approved by the Engineer.

Establish tack points at appropriate intervals for use in aligning stripes, and set a stringline from such points to achieve accuracy.

Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 40°F [5°C] and rising. Follow the manufacturer's recommendations for application temperature. Do not apply pavement markings when winds are sufficient to cause spray dust.

Apply traffic stripes or markings, having well defined edges, over existing pavement markings such that not more than 2 inches [50 mm] on either end and not more than 1 inch [25 mm] on either side is visible.

Apply all final traffic stripes and markings prior to opening the road to traffic.

Reapply all final traffic stripes and markings a minimum of 14 days after first application but prior to final acceptance of the project.

710-4.2 Corrections for Deficiencies to Applied Traffic Stripes and Markings: Remove and reapply a 1.0 mile [1.0 kilometer] LOT centered around any deficiency, at no additional cost to the Department.

710-4.3 Rate of Paint Application: Meet the following minimum rate of application:

6 inch [150 mm] solid traffic stripe: 25 gal/mi [59 L/km].

6 inch [150 mm] skip traffic stripe: 6.2 gal/gm [15 L/gkm].

Any other width stripe: a direct proportion of the above.

710-4.4 Required Film Thickness: Apply paint to attain a minimum wet film thickness of 15 mils [380 μm].

710-4.5 Application of Spheres: Apply glass spheres immediately and uniformly following the paint application, at a rate of not less than 6 lb/gal [0.72 kg/L] of paint.

710-4.6 Retroreflectivity: Apply white and yellow pavement markings that will attain an initial retroreflectance of not less than 300 cd/fc·ft² [300 mcd/lx·m²] and not less than 250 cd/fc·ft² [250 mcd/lx·m²], respectively. Ensure that the intermittent and final retroreflectance of white and yellow pavement markings are not less than 150 cd/fc·ft² [150 mcd/lx·m²]. This does not apply to transverse lines, bike lane symbols and longitudinal lines adjacent to or in a proposed bike lane.

710-4.7 Color: Use white striping and marking material that is pure white, free from any tint and showing no deviations from magnesium oxide color standard greater than the following:

Scale Definition	Magnesium Oxide Standard	Sample
RD	100	75% minimum
Reflectance		
a. Red-Green	0	-5 to +5
b. Yellow-Blue	0	-10 to +10

Use yellow striping and marking material which visually matches Federal Test Standard Number 595-color 33538, and meet the following criteria for chromaticity coordinates (x,y):

x	0.455	0.510	0.472	0.530
y	0.444	0.485	0.400	0.456

710-5 Tolerances in Dimensions and in Alignment.

710-5.1 Dimensions:

710-5.1.1 Longitudinal Lines: Apply painted skip segments of 10 foot [3 m], with a 30 foot [9 m] unpainted gap between segments. Apply painted segments with no more than ±12 inches [±300 mm] variance, so that over-tolerance and under-tolerance lengths will approximately balance. Apply longitudinal lines at least 2 inches [50 mm] from construction joints of portland cement concrete pavement.

710-5.1.2 Transverse Markings, Gore Markings, Arrows, and Messages: Apply paint in multiple passes when the marking cannot be completed in one pass, with an overall line width allowable tolerance of ±1 inch [±25 mm].

710-5.1.3 Contrast Lines: Use black paint to provide contrast on concrete or light asphalt pavement, when specified by the Engineer. Apply black paint in 10 foot [3 m] segments following each longitudinal skip line.

710-5.2 Alignment: Apply painted stripes, that will not deviate more than 1 inch [25 mm] from the stringline on tangents and curves one degree or less. Apply painted stripes that will not deviate more

than 2 inches [50 mm] from the stringline on curves greater than one degree. Apply painted edge stripes uniformly, not less than 2 inches [50 mm] or more than 4 inches [100 mm] from the edge of pavement, without noticeable breaks or deviations in alignment or width.

710-5.3 Correction Rates: Make corrections of variations in width at a maximum rate of 10 feet [3 m] for each 0.5 inch [13 mm] of correction. Make corrections of variations in alignment at a maximum rate of 25 feet [8 m] for each 1 inch [25 mm] of correction, to returned to the stringline.

710-5.4 Alignment of Stripes: Remove and replace at no additional cost to the Department traffic stripes that deviates more than 1 inch [25 mm] in any 40 feet [12 meters] from the stringline.

710-6 Contractor's Responsibility for Notification.

Notify the Engineer prior to the placement of the materials. Furnish the Engineer with the manufacturer's name and LOT numbers of the materials and glass spheres to be used. Ensure that the approved LOT numbers appear on the materials and glass spheres packages. Submit a certified test report to the Engineer indicating that the materials meet all requirements specified.

710-7 Protection of Newly Painted Stripes.

Do not allow traffic onto newly applied traffic stripes and markings until they are sufficiently dry to permit vehicles to cross them without damage. Remove and replace any portion of the traffic stripes and markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

710-8 Method of Measurement.

The quantities to be paid for under this Section will be as follows:

- (1) The length, in gross miles [kilometers], of Skip Traffic Stripes.
- (2) The length, in net miles [net kilometers], of Solid Traffic Stripes.
- (3) The length, in feet [meters], of Solid Traffic Stripes and Skip Traffic Stripes.
- (4) The number of directional arrows and pavement messages, painted.
- (5) The area, in square feet [square meters], of Reflective Paint (Island Nose).
- (6) The area, in square feet [square meters], of Remove Existing Markings.
- (7) Re-application as specified in (1) through (6).

The quantities to be paid for will also include 6' - 10' skip [2m - 3m skip] traffic stripe sections as indicated in the plans. Measurement will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe with proper deductions made for unpainted intervals as determined by plan dimensions or stations, subject to 9-1.3. Unpainted intervals will not be included in pay quantity.

The gross-mile [gross-kilometer] measurement of Skip Traffic Stripes will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe, and will include the unpainted intervals. It will not include any lengths of unpainted intervals which, by design or by other intent of the Department, are greater than 30 feet [9 m]. Final measurement will be determined by plan dimensions or stations, subject to 9-1.3.1.

710-9 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

- Item No. 710- 6- Directional Arrow, Painted - each.
- Item No. 2710- 6- Directional Arrow, Painted - each.
- Item No. 710- 7- Pavement Messages, Painted - each.
- Item No. 2710- 7- Pavement Messages, Painted - each.

Item No. 710- 11- Remove Existing Markings (Paint) - per square foot.
Item No. 2710- 11- Remove Existing Markings (Paint) - per square meter.
Item No. 710- 21- Skip Traffic Stripe (White/Black) - per gross mile.
Item No. 2710- 21- Skip Traffic Stripe (White/Black) - per gross kilometer.
Item No. 710- 22- Skip Traffic Stripe (Yellow) - per gross mile.
Item No. 2710- 22- Skip Traffic Stripe (Yellow) - per gross kilometer.
Item No. 710- 23- Solid Traffic Stripe (White/Black) - per net mile.
Item No. 2710- 23- Solid Traffic Stripe (White/Black) - per net kilometer.
Item No. 710- 24- Solid Traffic Stripe (Yellow) - per net mile.
Item No. 2710- 24- Solid Traffic Stripe (Yellow) - per net kilometer.
Item No. 710- 25- Solid Traffic Stripe (White/Black) - per foot.
Item No. 2710- 25- Solid Traffic Stripe (White/Black) - per meter.
Item No. 710- 26- Solid Traffic Stripe (Yellow) - per foot.
Item No. 2710- 26- Solid Traffic Stripe (Yellow) - per meter.
Item No. 710- 27- Skip Traffic Stripes (White/Black) - per foot.
Item No. 2710- 27- Skip Traffic Stripes (White/Black) - per meter.
Item No. 710- 28- Skip Traffic Stripe (Yellow) - per foot.
Item No. 2710- 28- Skip Traffic Stripe (Yellow) - per meter.
Item No. 710- 29- Reflective Paint (Island Nose) (White) - per square foot.
Item No. 2710- 29- Reflective Paint (Island Nose) (White) - per square meter.
Item No. 710- 30- Reflective Paint (Island Nose) (Yellow) - per square foot.
Item No. 2710- 30- Reflective Paint (Island Nose) (Yellow) - per square meter.
Item No. 710- 79- Alternating Skip Traffic Stripe - per gross mile.
Item No. 2710- 79- Alternating Skip Traffic Stripe - per gross kilometer.